

ALFALFA DISEASE AND RESISTANT VARIETIES

By: Dr. Donald R. Miller
ABI Alfalfa

Much progress has been made by alfalfa breeders in the last 20 years in the area of disease resistance, which is reflected by the ever increasing number of new varieties on the market. However, with the proliferation of new varieties also comes increased difficulty in choosing a variety. Farmers should, however, keep in mind the following factors that will aid in the variety selection process:

Selection of resistant varieties is still the best and most economical means of insuring maximum yield and stand life;

Knowledge of which alfalfa diseases are most prevalent at a location is critical, especially those diseases which have been known to reduce yield and stand life in the past;

Knowledge of any potential new diseases reported in your area should be considered (farm advisors are a good source for this information);

Review yield data (if available) from university research locations most representative of your farm, or consult the local farm advisor for a list of 4-6 varieties that have done well in your area.

Armed with the above information, a farmer should be able to narrow the list of potential varieties to one or two that have the best yield and disease package for his farm.

WHAT RESISTANCE MEANS IN ALFALFA

Often there is much confusion over what is actually meant by the term "resistant", when used in association with alfalfa varieties. Due to the complex genetic makeup and breeding behavior of alfalfa, breeders have modified the use of the word. Many farmers are familiar with the term "resistant" in association with other crops in which all the plants of a variety are genetically identical, or uniform, as in the case of hybrids. In these cases resistance is carried by every individual plant in the variety. Alfalfa varieties are different in the sense that every plant within a variety is genetically different from the one next to it.

Some plants in a variety may be resistant while others are susceptible. For this reason alfalfa breeders are forced to describe their varieties based on the average performance of all the individual plants in the variety. Therefore the term "resistant" has been subdivided into several groupings based on the percentage of individuals displaying resistance within a variety. The term "High Resistance" (HR) describes a variety that has 51% or more of its plants exhibiting resistance. A graduation of resistance (Fig.1) is used to describe 5 distinct categories with the last being "Susceptible" (S) in which 5% or less of the plants exhibit resistance.

Fig 1

	% Resistant
HR = High Resistance	51 +
R = Resistance	31 - 50
MR = Moderate Resistance	16 - 30
LR = Low Resistance	6 - 15
S = Susceptible	0 - 5

National Alfalfa Variety Review
Board Terminology.

This rating system is used by alfalfa breeders across the U.S. and is utilized by the National Alfalfa Variety Review Board in conjunction with its standardized testing procedures in describing alfalfa varieties.

At first glance these levels of resistance would appear to be insufficient to provide adequate protection under field conditions, since even a resistant variety has a significant level of susceptible plants. However, repeated studies have shown that each level of resistance displays an appreciable level of benefit that is statistically different from the others. One proposed explanation of this field performance is that the resistant plants are randomly distributed throughout the field in such a manner that interrupts the spread of the pathogen (Fig. 2). Therefore, a resistant variety needs only 31 - 50% resistance to effectively disrupt the effect of a pathogen and display significant economic advantage. Also, the remaining plants, not classified as resistant, may display various levels of susceptibility in which some plants may have only moderate damage from the pathogen.

Regardless of any explanation of resistance levels the farmer should select a variety with the combination of traits that best fits his situation. He should keep in mind that he may not need to have resistance to every pest since some may not be a problem in his climate or location. If he does his homework he should find varieties that will fit his needs and produce a positive economic return.

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